

# BATTERY HAVING A BUILT-IN CONTROLLER

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## ABSTRACT

A multiple-cell battery having a built-in controller is disclosed that extends the run time of the battery. The controller may extend the run time of the battery, for example, by converting the cell voltage to an output voltage that is greater than a cut-off voltage of an electronic device, by converting the cell voltage to an output voltage that is less than the nominal voltage of the electrochemical cell of the battery, or by protecting the electrochemical cell from current peaks. The controller may also include a ground bias circuit that provides a virtual ground so that a converter may operate at lower cell voltages. The battery may be a single-cell battery, a universal single-cell battery, a multiple-cell battery or a multiple-cell hybrid battery. The individual cells of the multiple-cell battery may be connected in series or parallel. In addition, the individual cells may have a controller in each cell that is capable of performing one or more functions to extend the run time of the cell.

"Express Mail" mailing label number: EH760279697US

Date of Deposit March 24, 1999

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